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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,348	11/07/2005	Gregory C. Roberts	15670-054US1 SD2002-186	5044

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EXAMINER	
PAJOOHI, TARA S	

ART UNIT	PAPER NUMBER
2886	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/528,348	ROBERTS ET AL.	
	Examiner	Art Unit	
	Tara S. Pajoohi	2886	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/25/08*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *3/17/05* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment

1. Acknowledgment is made to the amendment filed on 3/25/2008.

2. Currently, claims 1-27 are still pending in this application.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. **Claims 1-10, 12-14, 16-17 and 19-27** are rejected under 35 U.S.C. 102(a) as being anticipated by **Flagan et al. (U.S. Patent # 6,330,060).**

5. Considering **claims 1, 7 and 8,** Flagan discloses (col. 3-4) a device (100) comprising:

a. a cloud condensation nuclei chamber (120) having an input (110) to receive an aerosol flow (i.e., aerosol flow), a region (between 120a and 120B) of supersaturation to grow cloud condensation nuclei, and an output (150) to export the aerosol flow, the column cylindrically (column shaped is cylindrically shaped) shaped to direct aerosol flow along an axis of the cylinder and oriented vertically (col. 3, line 30) to receive the aerosol flow from the top and the output to export the aerosol from the bottom,; and

b. a thermal control (140) engaged to said chamber (120) to produce a monotonic thermal profile in a stream-wise direction of the aerosol flow from said input to said output in said chamber (monotonically increasing supersaturation profile from input to output along the aerosol flow, col. 3, lines 7-11 and col. 4, lines 30-34).

6. Considering **claims 2-4,** Flagan discloses (col. 4, lines 19-24) a temperature in said chamber monotonically increasing, linearly increasing or non linearly increasing along the aerosol flow (temperature profile along the column (applicants' chamber) can change in an alternating manner between high and low

temperatures (applicants' nonlinearly increasing along the aerosol flow) or the temperature increases between the input and the output (applicants' monotonically increasing and linearly increasing along the aerosol flow).

7. Considering **claim 5,** Flagan discloses (col. 3-4) a flow control mechanism (114) to split an air sample flow (col. 4, line 62) into the aerosol flow (112) and a sheath flow (114), wherein the sheath flow is directed along inner surfaces of said chamber to keep the aerosol flow away from the surfaces.

8. Regarding **claim 6,** Flagan discloses (col. 4, lines 45-59) controlling the aerosol flow and the sheath flow and that the sheath flow has a sheath flow rate higher (i.e., sheath flow increases) than a flow rate of the aerosol flow.

9. As per **claims 9 and 16,** Flagan disclose (col. 3-4) a cloud condensation nuclei measuring apparatus comprising:

a. a chamber (120) to receive an air sample (i.e., aerosol) and to keep said air sample in a region of supersaturation within a specified range;

b. a heating system (140, temperature controller) providing an increasing temperature gradient along the axis of said chamber in the direction of flow;

c. an optical particle counter (130) coupled to said chamber to measure particles in said air sample output by said chamber and to provide a count indicative of particles within a selected size range; and

d. wherein the heating system is configured to produce a monotonic thermal profile in a stream-wise direction of the flow (i.e., the temperature profile can produce a monotonically increasing supersaturation profile from input to output along the aerosol flow, col. 3, lines 7-11 and col. 4, lines 30-34).

10. Regarding **claim 10,** Flagan discloses (col. 4, lines 36-59) a flow control mechanism (mass flow controller, 114) to provide a sheath flow (114) around the air sample (112) in said chamber (120) and to keep the air sample away from side walls of said chamber.

11. As per **claim 12,** Flagan discloses (col. 3, line 45 – col. 4, line 5) a heating element (hot column segment (220)) to heat the sheath flow at a temperature above a temperature of an end of said chamber receives the air sample.

12. Regarding **claim 13,** Flagan discloses (col. 3, lines 50-51) said chamber has a wetted inner surface (i.e., side wall of the flow channel is wetted).

13. Regarding **claim 14,** Flagan discloses (col. 3, lines 50-54) said chamber has a layer of a filter paper on the wetted inner surface (i.e., filter paper lines the side walls of the wetted inner walls of the flow channel).

14. As per **claim 17,** Flagan discloses (col. 4, lines 19-24) a temperature along the axis of the chamber linearly increases (i.e., temperature increases between the input and the output).

15. Considering **claim 19,** Flagan discloses (col. 3, line 45 – col. 4, line 5) a thermal gradient diffusion chamber (thermal conductive tube, 230) for inclusion in a cloud condensation nuclei measurement apparatus comprising a heat source (22) to create an increasing temperature gradient in the direct of flow of an air sample in said chamber.

16. Regarding **claim 20,** Flagan discloses (col. 3, lines 50-51) said chamber has a wetted inner surface (i.e., side wall of the flow channel is wetted).

17. Regarding **claim 21,** Flagan discloses (col. 4, lines 19-24) a temperature along the axis of the chamber linearly increases (i.e., temperature increases between the input and the output).

18. Considering **claim 22,** Flagan discloses (col. 3-4) a method for conditioning a sample in a cloud condensation nuclei measurement apparatus, comprising:

a. subjecting a sample (112) passing through a column (120);

b. subjecting said sample to an increasing temperature gradient in a direction of sample flow (i.e., temperature increases between the input and the output of the column) and to have a monotonic thermal profile in a stream-wise direction of the sample flow (i.e., the temperature profile can produce a monotonically increasing supersaturation profile from input to output along the aerosol flow, col. 3, lines 7-11 and col. 4, lines 30-34).

19. Considering **claim 23,** Flagan discloses (col. 4, lines 46-59) using a sheath flow (114) around the sample flow (112) to keep the sample flow from inner surfaces of the column (120).

20. Regarding **claim 24,** Flagan discloses (col. 3, lines 50-51) said chamber has a wetted inner surface (i.e., side wall of the flow channel is wetted).

21. Considering **claim 25,** Flagan discloses (col. 3-4) a method, comprising:

a. directing an aerosol flow (112) through a cloud condensation nuclei chamber (120) to grow particles due to condensation from supersaturation; and

b. controlling a temperature profile (140) of the chamber along the aerosol flow to produce a nearly constant superstaturation along the chamber.

22. Regarding **claim 26,** Flagan discloses (col. 4, lines 46-59) providing a sheath flow (114) around the aerosol flow (112) to reduce particle loss caused by contact of particles in the aerosol flow and inner surface of the chamber (i.e., controlling filtering of particles).

23. Regarding **claim 27,** Flagan discloses (col. 4, lines 19-24) a temperature of the chamber increases monotonically along the direction of the aerosol flow (i.e., temperature increases between the input and the output).

Claim Rejections - 35 USC § 103

24. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

25. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not

commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

26. **Claims 11 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Flagan et al. (U.S. Patent # 6,330,060)**.

27. As per **claim 11,** Flagan discloses (col. 4, lines 36-59) controlling a sheath flow (114) around the air sample (112) but fails to specifically disclose the ratio of a flow rate of the sheath flow over a flow rate of the air sample is controlled between about 5 and 20.

However it would have been obvious to one having ordinary skill in the art at the time the invention was made to control the rate between about 5 and 20, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. It would have been further obvious in order to control the flow ratio in order to have a more accurate and controlled counting of the particles through the column.

28. As per **claim 15,** Flagan discloses (col. 3, lines 38-54) porous column (applicants' chamber) segments but fails to specifically disclose the chamber has a layer of a porous ceramic material on the wetted inner surface.

However it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a layer of porous ceramic material on the wetted inner surface, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416. It would have been further obvious to have a layer of porous ceramic material on the wetted inner surface in order to provide for continuous flow.

29. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Flagan et al. (U.S. Patent # 6,330,060)** in view of **Russell et al. (U.S. Patent # 5,922,976).**

30. Considering **claim 18,** Flagan fails to disclose the apparatus with a second chamber, second heating system and second particle counter.

However in the same field of endeavor, Russell discloses (col. 6) a cloud condensation nuclei measuring apparatus further comprising: a second chamber to receive a second chamber to receive a second air sample and to keep said second air sample in a region of supersaturation within a specified range; a second heating system providing an increasing temperature gradient along the axis of said camber in the

direction of flow; and a second particle counter to measure particles in said second air sample output from said second chamber and to provide a count indicative of particles within a selected size range.

It would have been obvious to one having ordinary skill in the art to have a second chamber, a second heating system and a second particle counter as taught by Russell, since such a modification to the cloud condensation nuclei measuring apparatus would increase the spatial resolution of the measuring apparatus (col. 6, line 61-63).

Response to Arguments

31. Applicant's arguments filed 2/25/2008 have been fully considered but they are not persuasive.

32. In response to applicant's arguments that "Flagan fails to specifically disclose a thermal control engaged to said chamber to produce monotonic thermal profile in a stream-wise direction of the aerosol flow from said input to said output in said chamber". However, the examiner respectfully disagrees. Flagan discloses (col. 3, lines 4-15) a temperature control (140) engaged to the CCN growth column (120). Flagan also discloses (col. 3, lines 55-64) the column segments are alternatively maintained at different high and low temperatures and that each segment has an electrical heating element connected to the temperature controller (140) and is maintained at a desired elevated temperature for that segment. Flagan continues to say that it is well known in the art to include a thermal control loop to actively control the temperature of each segment. Flagan further discloses (col. 4, lines 30-35) that the temperature profile [of the column (120)] can produce a monotonically increasing supersaturation profile along the center line of the condensation column which meets the limitation of a monotonic thermal profile in a stream-wise direction of the aerosol flow.

Conclusion

33. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH

shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tara S. Pajoohi whose telephone number is (571)272-9785. The examiner can normally be reached on Monday - Thursday 9:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur R. Chowdhury can be reached on 571-272-2287. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tara S. Pajoohi
Patent Examiner

TSP

/TARIFUR R CHOWDHURY/

Supervisory Patent Examiner, Art Unit 2886